found a second with numerous animal remains, the age of which did not admit of a doubt, and among them a human skeleton. The most important among the animal remains were bones of the hyæna, horse, marmot, *Ursus spelœus*, *Bos primigenius* and various species of deer, but none of the reindeer; also numerous remains of birds, and of land and marine mollusks. The weapons and instruments were made partly of bone, partly of stone, and belong in no case to the period of polished stone implements, but to the oldest stone age; some of the smaller instruments were made of quartzite or felsite. The human skeleton was not in so good a state of preservation as the other previously discovered; it lay extended on its back near the entrance to the cavern, the ground round it being covered with a stratified deposit of ashes, charcoal, fragments of bone, teeth of animals, mussel shells and stone implements. The height of the skeleton must have been, when perfect, as much as two metres or a little over, *i. e.* about six feet, six inches. M. Riviére refers without hesitation both the skeletons found near Mentone to the older stone age, about the end of the epoch of the cave-bear and *Rhinoceros tichorhinus*.—A. W. B.

MICROSCOPY.

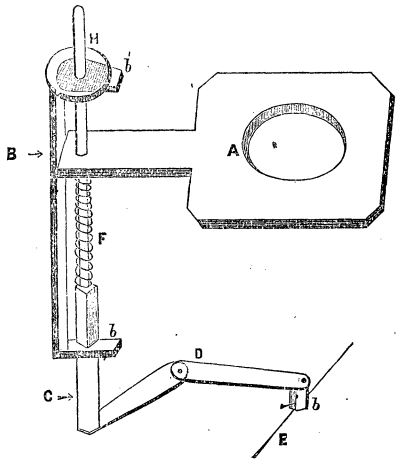
Arranging Diatomaceæ.—The convenience of having diatomaceæ arranged for observation is appreciated by all who make a study of this attractive branch of microscopic research.

The first requisite is a mechanical finger which may be had very cheaply after the following pattern:—A plate *A* (Fig. 79) is attached to the body of the microscope by the objective of from 1 inch to $\frac{2}{3}$ inch. To this plate is attached the part *B* perpendicular to *A;* this has the projections *b* and *b'* through which works the sliding shaft *C*, the lower part of which is square fitting accurately in the projection *b*. The shaft, the upper part of which is furnished with a screw-thread, is raised by turning the milled head *H*, the spiral spring *F* moving it downward. The arms *D* are attached to the shaft and to these the needle holder *d* in which the needle is placed at an angle of about 45°. This finger can be used with nicety with a little practice, and can be made by any one that has a little mechanical ability. I have made one that did not cost over 25 cents for the materials.

The other requirement is a stage plate to carry the thin glass cover. It should be about $1\frac{1}{2} \times 4\frac{1}{2}$ inches, upon which is made to

revolve a turntable represented by Fig. 80. *A* is the plate, *B* the turntable, the use of which in locating the object is apparent, *C*

Fig. 79.

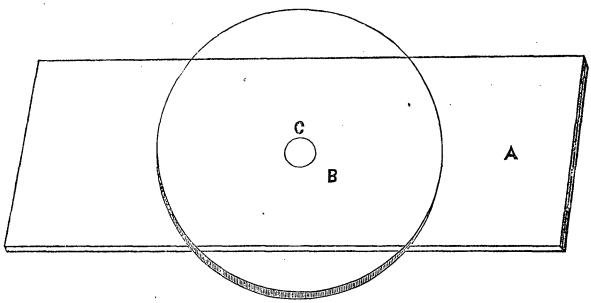


an aperture about $\frac{1}{4}$ inch in diameter for the transmission of light to the cover on which the arrangement is being made.

The cover should be coated by a very thin film of the purest gelatine dissolved in distilled water.

The process is now easily consummated. The cleaned diatoms

Fig. 80.



being evenly spread upon a glass slip and the slip placed upon the stage, select the specimen desired, let the sliding shaft down

by turning the milled screw till the point of the needle (which should be very fine, or a bristle may be used if preferred) touches the object, give it a few backward turns to lift it clear, then more rapidly by means of the coarse adjustment of the microscope; substitute the stage plate with the cover attached to it by some kind of cement and carry the plate, by means of stage movement, so that the object may be let down in the required position on the glass cover. Another may then be placed beside it, etc. After completing the arrangement, moisten the glue by breathing upon it or holding in the vapor of distilled water, though the latter is liable to wash the objects out of place unless dextrously managed. They are then secure and will sometimes bear rough usage in mounting without becoming displaced. Occasionally there will be a specimen that will adhere to the needle so persistently that we are liable to consider patience no longer a virtue. In such cases try another specimen, as different diatoms of the same species vary greatly in grade of difficulty. My experience is that discoid forms are most easily arranged and the light Naviculæ the most difficult. Sometimes air prevents the balsam from entering the frustule, which may be avoided by separating the valves of such as will admit of it, when time is of no consideration.

Thus any one of the requisite mechanical tastes can have slides of diatomaceæ arranged in squares or otherwise to suit the fancy, and a large number of specimens be examined without change of slides. The finest specimens may be thus secured, from impure gatherings, and reference made to any particular specimen without the use of the "finder."—W. W. RINER, *Greene, Iowa.*

HISTOLOGY.—Dr. James Tyson's magazine article, narrating his experience in the laboratories of Dr. Klein of London and of Prof. Stricker of Vienna, has been raised to a little book and published by Lippincott as an Introduction to Practical Histology. The additions to the original article are not extensive, but are designed to make it more comprehensive and more available as a hand-book for actual beginners in histology. While almost every microscopical treatise is full of mounted objects and mounting objects, it is refreshing to find even a small work which says hardly a word about either, but devotes itself entirely to microscopical study. Like most histologists, the author values highly the vertical use of the microscope, and says little of the binocular instrument.

He believes the "vegetable spores" of Salisbury and the "elementary corpuscles" of Zimmermann are fragments of the larger colorless blood corpuscles. For embedding tissues preparatory to cutting sections of them, he pins them into the centre of little boxes extemporized out of white paper, and pours the melted embedding material around them; seeming to prefer for this purpose the medium suggested by Dr. J. G. Hunt, which consists of common transparent soap cut into small pieces and melted in a water-bath with the aid of alcohol, this being a cleanly and transparent material which can be kept in a bottle and easily melted (by placing the bottle in warm water) and poured out when necessary. The only serious mistake in the book is the measurement of the image, in estimating magnifying power, at the distance of the stage instead of at ten inches; an erroneous procedure repeatedly pointed out by us in other cases, and in this case beautifully illustrated by the direction on the same page to measure it, when using the camera lucida, at the distance of ten inches, which of course would give the same results in exactly those instruments whose stage happened to be ten inches from the observer's eye. On the whole, beginners in histology should thank Dr. Tyson for a neat, handy, and timely work whose usefulness is far in advance of its size.

MORPHOLOGY OF THE SAPROLEGNIEI.—This doubtful family, that seems now finally deposited in the algæ, has now considerable economic interest from the destructive effects produced upon fish eggs in the hatching trays, supposed to be caused by *Achlya prolifera*. The following summary is translated from advance sheets of "Contributions to the morphology and systematic relations of the Saprolegniei;" by N. Pringsheim. (Jahrbuch für wissenschaftlicher Botanik, ix, Bd. 2tr. Heft.)

The results of my investigations on the Saprolegniei may be condensed as follows:

1. In all the Saprolegniei the male organs of generation develop from the well known antheridia, that are formed near, or grow toward the oogonia.

2. Those in which antheridia or their equivalents are wanting, are not, as has been supposed, distinct species, with modified organs, but parthenogenetic forms, whose sporangia ripen and bud without fertilization.

3. In the Saprolegniei there is but one kind of sporangia; those which develop parthenogenetically, and those which are fertilized are identical, and show no difference originally. The unfertilized zoospores grow sooner and more readily than those which are fertilized.

4. Several peculiarities in the formation of zoospores, which have been considered sufficient specific distinctions, are not important as such, but are merely evidences of a greater or less tendency to dimorphism, representing various stages of development in the zoospores.

5. Also various sexual forms of growth may appear in the same species, which are not reliable as specific distinctions.— W. H. S.

Section Cutters.—At the Queckett Club, Mr. T. C. White alluded to the impracticable expensiveness of many excellent section cutters, and stated that he had used with great success a contrivance, which consisted of a brass tube fastened at right angles with a brass plate, upon which a glass plate with a corresponding aperture was cemented for a cutting surface. The substance to be cut was embedded in an inner tube which was simply pressed up by the finger when required.

Mr. Walter White read a paper on the "Science-Gossip" section cutter in which the plug holding the object is raised by slight blows upon a wedge, instead of by a screw.

The President, Dr. R. Braithwaite, said that he did not possess a section machine, but was accustomed to cut sections of sphagnum and other leaves by inserting them in a slip of soft cork and cutting them by hand.

Lecture-illustrations of Microscopic Objects.—Rev. W. H. Dallinger has communicated to the Royal Microscopical Society an improved method of preparing transparencies for use with the lime-light and lantern. He finds large drawings unsatisfactory for a large audience, as well as incomplete in detail, unless prepared with great labor and skill, and the usual transparencies for screen use, whether photographed or painted, cost too much time and labor to be always available. To obviate these difficulties, he draws the magnified image on a surface of finely ground glass of the size of a magic-lantern slide. The drawing is as easily done as upon card, using a black lead pencil, and the camera lucida if

necessary. Colors may be added, if desired, by a sable-hair pencil. The surface is then protected, and the drawing instantly changed into a transparency, by flowing thin balsam over it and allowing it to dry as a thin film over the surface. In the same manner illustrations of subjects not microscopical may be easily and rapidly prepared.

PODURA SCALES.—A happy accident has furnished Mr. F. H. Wenham a supply of specimens that seem to confirm the theory he so strongly defends of the reality of the spines on this most disputed of "tests." A favorite specimen which contained a detached spine having been destroyed, and an effort to remove uninjured the large scales which adhered to the broken cover-glass having failed, he scraped off the scales at random with a sharp knife edge and mounted the fragments, and was pleased to find many of the fragments cut obliquely in such manner as to leave the spines (!) cut at a different plane and manifestly projecting beyond the other portions. Mr. Wenham's drawings certainly seem to confirm his descriptions, and photographs of the same appearances are promised.

LENGTHENED IMMERSION TUBE.—Mr. E. Richards, of the Royal Microscopical Society, renders the familiar immersion arrangement available in deep water, eight to ten inches, by screwing in an adapter between the objective and the nose piece of the microscope. This carries the objective with its immersion cap down through the stage and into a tank of water beneath it.

AUTOMATIC TURN-TABLE.—Dr. F. B. Kimball prefers this arrangement to the usual method of turning by hand. He uses the works of a common clock, putting a pin through the shaft of the table and cutting a slot in the hand arbor of the clock-work, and then mounting the turn-table so that the pin will catch in the slot and the two move together.

ORIGIN OF BLOOD CORPUSCLES.—Dr. H. D. Schmidt, of New Orleans, has communicated an elaborate study of this subject to the Royal Microscopical Society. His studies were chiefly directed to human embryos of six weeks old, and upward. He is convinced that the nucleus only, of the colorless blood-corpuscles, is developed into the red corpuscle. He strongly confirms the prevalent opinion that the spleen and lymphatic glands are the perma-

nent blood-formative organs. He looks upon the blood corpuscle as a gland-cell destined to promote within itself the transformation, into other elements, of certain materials derived from the liquor sanguinis, and when matured to give back directly "to the liquor sanguinis, by its final dissolution, its secretion, consisting of its own body."

SUBSTITUTE FOR THE CAMERA LUCIDA.—Mr. W. Kesteven, Jr., substitutes the thinnest possible cover-glass for the tint-glass commonly used for camera lucida purposes. He does not appear to suffer from the difficulty of too great transparency which has deterred others from its use.

NOTES.

Two months ago, in announcing the provision made by the Legislature of Kentucky for a geological survey, we asked whether the time were not coming for a careful geological and zoological survey of Massachusetts. Since then, active measures have been taken to secure this result. The American Academy of Arts and Sciences (the oldest and highest scientific body in the state) has petitioned the Legislature, and a memorial, referred at first to the Committee on Education, has now been placed in the hands of the Board of Education with instructions to investigate the matter and report at the assembling of the next legislature. The memorial of the Academy, before its adoption, was thoroughly considered by a special committee, consisting of the President (Hon. Charles Francis Adams) Professors William B. Rogers and T. Sterry Hunt, and Messrs. George B. Emerson, Alex. Agassiz, S. H. Scudder and R. H. Dana, Jr., so that we can have no doubt of a favorable report from the Board of Education.

The publications of such a survey, says the Academy, in its memorial, should embrace a detailed topographical map, on a scale of about an inch to a mile, maps colored to show the distribution of rock-formations and economic minerals, with charts on a larger scale of particular localities, having special interest or importance; sections and explanatory text to accompany these maps, embracing descriptions and analyses of the rocks and ores and of the waters, and investigations into the strength and durability of our building-stones; full descriptions and truthful illustrations of the animals and plants, including their natural history, transformations and relations to man and his requirements.